CLAIMS

What is claimed is:

1. A compound comprising a metal complexed with a chelating group attached to a gastrin releasing peptide (GRP) receptor agonist which includes a bombesin agonist binding moiety.

2. The compound according to claim 1, wherein said compound has a structure of the formula X-Y-B wherein X is a metal chelating group, Y is a spacer group or covalent bond and B is a gastrin releasing peptide receptor agonist which includes a bombesin agonist binding moiety.

3. The compound of claim 2 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof.

4. The compound of claim 2 wherein X is selected from the group consisting of DOTA, DTPA, S4, N3S, N2S2, NS3 and derivatives thereof.

5. The compound of claim 4 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

6. The compound of claim 4 wherein X is DOTA or a derivative thereof.

7. The compound of claim 6 wherein Y is selected is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

8. The compound of claim 7 wherein Y is a combination of L-glutamine and a hydrocarbon chain.

9. The compound of claim 8 wherein Y is a combination of L-glutamine and a C1 to C10 hydrocarbon chain.

10. The compound of claim 9 wherein Y is selected from the group consisting of glycine, β-alanine, gamma-aminobutanoic acid, 5-aminovaleric acid (5-Ava), 6-aminohexanoic acid, 7-aminoheptanoic acid, 8-aminooctanoic acid (8-Aoc), 9-aminononanoic acid, 10-aminodecanoic acid and 11-aminoundecanoic acid (11-Aun).

11. The compound of claim 4 wherein X is N3S or a derivative thereof.

12. The compound of claim 11 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

13. The compound of claim 12 wherein Y is gly-ser-gly.

14. A complex comprising a metal and a compound having a structure of the formula X-Y-B wherein X is a metal chelating group, Y is a spacer group or covalent bond

and B is a gastrin releasing peptide receptor agonist which includes a bombesin agonist binding moiety.

15. The complex of claim 14 wherein the metal is selected from the group consisting of transition metals, lanthanides, auger-electron emitting isotopes, and α-, β- or γ-emitting isotopes.

16. The complex of claim 14 wherein the metal is selected from the group consisting of: 105Rh-, 99mTc-, 186/188Re-, 153Sm-, 166Ho-, 111In-, 90Y-, 177Lu-, 149Pm-, 166Dy-, 175Yb-, 199Au- and 117mSn-.

17. The complex of claim 16 wherein X is selected from the group consisting of DOTA, DTPA, S4, N3S, N2S2, NS3 and derivatives thereof.

18. The complex of claim 17 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

19. The complex of claim 16 wherein X is DOTA or a derivative thereof.

20. The complex of claim 19 wherein Y is selected is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

21. The complex of claim 20 wherein Y is a combination of L-glutamine and a hydrocarbon chain.

22. The complex of claim 21 wherein Y is a combination of L-glutamine and a C1 to C10 hydrocarbon chain.

23. The complex of claim 22 wherein Y is selected from the group consisting of glycine, β-alanine, gamma-aminobutanoic acid, 5-aminovaleric acid (5-Ava), 6-aminohexanoic acid, 7-aminoheptanoic acid, 8-aminooctanoic acid (8-Aoc), 9-aminononanoic acid, 10-aminodecanoic acid and 11-aminoundecanoic acid (11-Aun).

24. The complex of claim 23 wherein Y is 8-aminooctanoic acid.

25. The complex of claim 23 consisting of 90Y-DOTA-8-Aoc-BBN(7-14)NH2.

26. The complex of claim 23 consisting of 111In-DOTA-8-Aoc-BBN(7-14) NH2.

27. The complex of claim 23 consisting of 177Lu-DOTA-8-Aoc-BBN(7-14) NH2.

28. The complex of claim 23 consisting of 149Pm-DOTA-8-Aoc-BBN(7-14) NH2.

29. The complex of claim 23 consisting of 90Y-DOTA-5-Ava-BBN(7-14)NH2.

30. The complex of claim 23 consisting of 111In-DOTA-5-Ava-BBN(7-14) NH2.

31. The complex of claim 23 consisting of 177Lu-DOTA-5-Ava-BBN(7-14) NH2.

32. The complex of claim 23 consisting of 149Pm-DOTA-5-Ava-BBN(7-14) NH2.

33. The complex of claim 16 wherein X is N3S or a derivative thereof.

34. The complex of claim 33 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

35. The complex of claim 34 wherein Y is gly-ser-gly.

36. The complex of claim 34 consisting of 99mTc-N3S-gly-ser-gly-BBN(7-14)NH2.

37. A method of treating patient using radioisotope therapy by administering an effective amount of a pharmaceutical comprising a metal complex with a chelating group with a gastrin releasing peptide receptor agonist which includes a bombesin agonist moiety.

38. The method according to claim 37, wherein said method includes administering an effective amount of a complex comprising a metal and a compound having a structure of the formula

X-Y-B

wherein X is a metal chelating group, Y is a spacer group or covalent bond and B is a gastrin releasing peptide receptor agonist which includes a bombesin agonist binding moiety.

39. The method of claim 38 wherein the metal is selected from the group consisting of transition metals, lanthanides, auger-electron emitting isotopes, and α-, β- or γ-emitting isotopes.

40. The method of claim 38 wherein the metal is selected from the group consisting of: 105Rh-, 99mTc-, 186/188Re-, 153Sm-, 166Ho-, 111In-, 90Y-, 177Lu-, 149Pm-, 166Dy-, 175Yb-, 199Au- and 117mSn-.

41. The method of claim 40 wherein X is selected from the group consisting of DOTA, DTPA, S4, N3S, N2S2, NS3 and derivatives thereof.

42. The method of claim 41 wherein X is DOTA or a derivative thereof.

43. The method of claim 42 wherein Y is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

44. The method of claim 43 wherein Y is a combination of L-glutamine and a hydrocarbon chain.

45. The method of claim 44 wherein Y is selected from the group consisting of glycine, β-alanine, gamma-aminobutanoic acid, 5-aminovaleric acid (5-Ava), 6-aminohexanoic acid, 7-aminoheptanoic acid, 8-aminooctanoic acid (8-Aoc), 9-aminononanoic acid, 10-aminodecanoic acid and 11-aminoundecanoic acid (11-Aun).

46. A method of imaging a patient by administering to a subject a diagnostically effective amount of a compound as set forth in claim 1.

47. The method of claim 46, wherein said method includes administering an effective amount of a complex comprising a metal and a compound having a structure of the formula

X-Y-B

wherein X is a metal chelating group, Y is a spacer group or covalent bond and B is a gastrin releasing peptide receptor agonist which includes a bombesin agonist binding moiety.

48. The method of claim 47 wherein the metal is selected from the group consisting of transition metals, lanthanides, auger-electron emitting isotopes, and α-, β- or γ-emitting isotopes.

49. The method of claim 48 wherein X is selected from the group consisting of DOTA, DTPA, S4, N3S, N2S2, NS3 and derivatives thereof.

50. The method of claim claim 49 wherein X is N3S or a derivative thereof.

51. The method of claim 50 wherein Y is selected is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof and B is selected from the group consisting of BBN(7-14) and BBN(8-14).

52. The method of claim 51 wherein Y is gly-ser-gly.

53. A method of forming a therapeutic or diagnostic compound comprising the step of reacting a metal complexed with a chelating group with a gastrin releasing peptide receptor agonist which includes a bombesin agonist moiety.

54. The method of claim 53, wherein said method includes reacting a metal with a compound having a structure of the formula

X-Y-B

wherein X is a metal chelating group, Y is a spacer group or covalent bond and B is a gastrin releasing peptide receptor agonist which includes a bombesin agonist binding moiety.

55. The method of claim 54 wherein the metal is selected from the group consisting of transition metals, lanthanides, auger-electron emitting isotopes, and α-, β- or γ-emitting isotopes.

56. The method of claim 54 wherein the metal is selected from the group consisting of: 99mTc- and 186/188Re-.

57. The method of claim 56 wherein Y is selected is selected from the group consisting of at least one amino acid residue, a hydrocarbon chain and a combination thereof.

58. The method of claim 57 wherein X is selected from the group consisting of DOTA, DTPA, S4, N3S, N2S2, NS3 and derivatives thereof.

59. The method of claim 58 wherein B is selected from the group consisting of BBN(7-14) and BBN(8-14).

60. The method of claim 59 wherein X is DOTA or a derivative thereof and Y is selected from the group consisting of glycine, β-alanine, gamma-aminobutanoic acid, 5-aminovaleric acid (5-Ava), 6-aminohexanoic acid, 7-aminoheptanoic acid, 8-aminooctanoic acid (8-Aoc), 9-aminononanoic acid, 10-aminodecanoic acid and 11-aminoundecanoic acid (11-Aun).

61. The method of claim 59 wherein X is N3S or a derivative thereof and Y is gly-ser-gly.